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ABSTRACT

The CERES (Career Education Responsive to Every Student) Model Project for grades K-12 was evaluated by an outside party as well as internally by project staff (see CE 017 740). The external summative evaluation was limited to assessing project effectiveness based on pre- and posttests for the following objectives: (1) career education knowledge and awareness, career choice, and obtaining information about careers in grades 7 and 8; (2) job application skills in grade 9; (3) knowledge of auto mechanics, basic vocabulary, and career education information in auto-English classes; (4) improvement in attitude toward, and increase in knowledge of, career education among teaching interns; and (5) developing a pilot testing program to evaluate career education in elementary schools. It was concluded that CERES staff members function well as a team and receive much support from administrators, teachers, and the community; that career education seems strongest at the elementary level and at the skill-preparation level in the secondary schools; that the special education component needs more leadership, and articulation should be improved among all components; that the project has not only increased the students' career awareness but has also favorably influenced preservice teaching interns; and that a stronger conceptual framework, as well as more effective instructional materials, needs to be developed. (ELG)

ED162073

AN EVALUATION OF THE CERES MODEL PROJECT-- CAREER EDUCATION RESPONSIVE TO EVERY STUDENT CERES, CALIFORNIA

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INTRODUCTION

The Ceres Unified School District contracted with Policy Studies in Education (PSE) in mid-September, 1975, to perform an external evaluation of the CERES (Career Education Responsive to Every Student) Model Project which had been funded for the 1975-76 school year by the Office of Career Education of the United States Office of Education. In consultation with the Project staff, it was decided that PSE's evaluation should be both formative and summative, although the primary focus would be on the summative evaluation of student learning.

Our formative evaluation activities which were designed to help the Project staff evaluate and improve the career education on-going program and the procedures which were being designed and used for carrying out that program most often took place during PSE staff's three site visits to Ceres, California, subsequent progress reports and memoranda, and by telephone consultations. Our formative evaluation activities included:

- interviewing Project and school staff and offering recommendations for program components to be continued or changed;
- critiquing the career education program's elementary school component and offering recommendations about evaluation instruments, procedures, and designs;
- developing a checklist of suggested student behaviors in vocational classes that may predict worker behavior; and
- providing conclusions and recommendations about the project mid-year in our Interim Progress Report.

The results of the above formative evaluation activities, as well as others which we carried out this past year, will not be presented in this final report; those results and subsequent recommendations have already been transmitted to the Project staff during the year, and the reader may refer to PSE's memoranda and progress reports for further details.

This final report will concentrate on the summative evaluation planned --the results of five student tests at a variety of grade levels and the development of a final version of two elementary level student instruments. Indeed, PSE was assessing the Project's impact on Ceres students.

In order to guide the year-long evaluation of the Project, PSE first helped the Project staff identify and quantify objectives for which they were willing to be held accountable during 1975-1976. Due to the ambitious nature and deep commitment to career education of the Project staff, many objectives were set in the fall of 1975. When it became clear by November that not all Project objectives could be assessed because of evaluation budget limitations, Ceres established priorities among its objectives and designated those for which it wished to be held accountable and which it wished PSE to evaluate. Ceres itself indicated that it would conduct formative/summative evaluations for certain additional objectives by using their own internal resources.

Thus, those objectives selected for external evaluation were those which best met PSE's capabilities as well as those which were most important in order to measure the success of the entire Project. Therefore, the information presented in this final evaluation report describes only the evaluation of some of the Project's objectives; the reader must review the final Project Performance Report supplied by the Project staff itself for the measurement and accomplishment of other objectives.

Of the 16 Project objectives originally assigned to PSE for evaluation, almost half were concerned with formative evaluation (and thus will not be reported on here) and several have been changed and reworded during the year to accommodate Project circumstances and statistical analysis plans. Therefore, PSE will offer a detailed look at six final objectives. Each objective

will be discussed in turn with a narrative which explains the way the objective was evaluated and a Findings section which presents the results of the evaluation.

The six charts located throughout Assessment of Project Objectives are a PSE-developed format for presenting the Project's objective, the Project staff's program plan for accomplishing that objective, and PSE's matching evaluation plan for assessing the accomplishment of that objective.

The Project staff's program plan includes the target population for the objective, the program activities to be used with that population, and the timeline for conducting those activities.

The matching evaluation plan formulated by PSE includes the identification of the data to be collected and the sources of those data, the size and composition of the population sample from which the data are to be sought, the evaluation instrument to be used, the time(s) of administration of that instrument, and when appropriate, the experimental design employed for the data collection.

By reading down each chart, the reader can determine for whom, how, and when the given objective was to be accomplished and how it was evaluated (what data were to be gathered from what population samples with what instruments according to what experimental design).

Following Assessment of Project Objectives, PSE offers some conclusions about the Project as a whole and some recommendations for the future of career education in Ceres, all of which are based on interviews, visits to the district, review of key documents and materials, and the results of our summative evaluation.

ASSESSMENT OF PROJECT OBJECTIVES

SEVENTH GRADE STUDENTS OBJECTIVE

OBJECTIVE

Seventh grade students will show significant growth (.05 level) in career education knowledge and awareness in areas such as identifying personal interests and abilities, understanding the relationship of these to the choice of a future job, and obtaining basic information about careers.*

PROGRAM PLAN

Target Population. All seventh grade students

Activity. Participate in the Seventh Grade Guidance and Career Awareness unit

Timeline. September, 1975 - June, 1976

EVALUATION PLAN

Data and Data Source. Students' pretest and posttest scores

Sample Size. Approximately 50 program students

Instrument. PSE-developed test

Time(s) of Administration. January and March

Design. Pretest/posttest without controls

*Formerly objectives 4 and 5 in PSE's Evaluation Design.

SEVENTH GRADE STUDENTS OBJECTIVE

In order to determine what career education knowledge students were gaining from the Ceres-developed Seventh Grade Guidance and Career Awareness unit, PSE studied the unit and created test items to match its content. The test consisted mainly of four-part multiple choice items, although several open-ended items were also designed due to the nature of the unit.

More than 70 items were pilot tested in Ceres in early January. From an analysis of these results, PSE was able to choose the 35 items which were most appropriate for these students and which were difficult enough so that student growth from a pretest to posttest could be shown.

The final version of this seventh grade test was used to pretest two classes of program students in late January; at the end of the 9-week course in March, a posttest was also administered to these same program students. In addition, PSE asked the Project staff to administer this test (the pretest and posttest was the exact same instrument) to a random selection of 30 non-program students (those seventh graders who had not yet taken this guidance and career awareness course). Because the 9-week treatment period was so short, thereby disallowing normal maturation effects, we did not feel it was necessary to pretest the non-program students.

Unfortunately, PSE received a notice that the box of seventh grade program students' posttests had been destroyed in the mail when it was on its way from California to our offices in New York. We also did not receive the non-program (control group) students' tests. Therefore, we had to rework our experimental design for this testing procedure. Fortunately, Ceres was able to regenerate the program students' posttest scores, although we could not match these individual scores to specific students.

Thus, the available data consisted of two distributions of student test scores. One distribution was of 54 pretest scores, while the other was of 51 posttest scores. As we have already explained, it was not possible to match the scores (i.e., to obtain a pretest and posttest score for each student) or, in fact, to know to what extent the exact same students comprised the two groups. Because of the possibility of different subject composition on the pre- and post-distributions, the two groups were treated as independent groups in the analysis. A median test was done to see if there was a difference in control tendency, specifically the median, between the two distributions of scores.

Findings

In spite of these difficulties in the testing and data analysis procedures, we were able to carry out acceptable alternative analysis to find there was a statistically significant difference between the program student group's pretest and posttest scores. Using the median test score as our reference point, we determined that the posttest distribution did have a significantly higher median than the pretest distribution (significant at the .04 level).

According to our analysis, 63% of the program students scored below the median on the pretest, and only 37% of these students scored above the median on the pretest. However, in the posttest, only 43% of the program students scored below the median, while 57% of the students now scored above the median.

Even though the students did seem to learn some career education information about the identification of their personal interests and abilities, about the relationship of these to the choice of a future job, and about ways to obtain basic information on careers, their scores were very low

in the pretest (as they should be) but also still fairly low on the posttest. The Project Director explained that a new teacher had been given the responsibility for this mini-course and that the performance of that teacher had been somewhat less than satisfactory. However, since students did learn some information perhaps in spite of the teacher, this guidance and career awareness unit should be viewed favorably by the Project staff and school administrators at least temporarily. PSE would recommend that our test be used next year in a pretest/posttest with control group experimental design. The results of this further testing would prove more conclusive than these initial results have this year.

Table 1 summarizes the results of the data analysis. See the Appendix of this report for a copy of the PSE-developed Seventh Grade Career Guidance Test.

Table 1

Percent of Scores At or Below and Above Combined Median for the Pre- and Post- Distributions

	At or Below Median	Above Median	Significance Level
Pretest	63%	37%	.04
Posttest	43%	57%	

EIGHTH GRADE STUDENTS OBJECTIVE

In addition to the seventh grade guidance and career awareness mini-course, the Ceres Project staff has also developed an eighth grade version of the course, Career Guidance, Exploration, and Planning. This course works further on enabling students to identify their interests and abilities and to see the relationship of these to the world of work; furthermore, this course helps students explore the decision-making process and helps them learn to identify and apply its components.

In order to measure the eighth grade students' increase in career education information as a result of participating in this course, PSE piloted a 55-item test in Ceres in late March at the beginning of one of the nine-week unit courses. From the results of this pilot test, PSE chose 40 items for inclusion in the final test version; the students' pilot test scores on these 40 items were used as pretest scores. The test was made up of four-part multiple choice items.

At the end of the nine weeks, a posttest was administered to these eighth grade program students as well as to a random selection of non-program students. Because by that time all eighth grade students had taken this unit on career guidance, the non-program students were chosen from eligible seventh graders. It was PSE's judgment that seventh graders in June were a suitable control group for this eighth grade course since eighth graders could take the course as early as September of their eighth grade year; in other words, there is relatively little difference between seventh graders in June and eighth graders in September.

Findings

In order to ascertain if this control group was indeed equivalent in test performance to the eighth graders before the beginning of the mini-course, a t-test for independent samples was done on the scores of these two groups. A non-significant difference was found between the means of the two groups as shown in Table 2; thus, the group of seventh graders was considered an adequate control.

Table 2

Means and Standard Deviations of
Eighth Grade Pretest Scores and
Seventh Grade Control Group Scores and t Value

Eighth Grade Pretest Scores	Seventh Grade Control Scores	t Value	Significance Level
$\bar{x}$ = 20.41 s.d. = 6.84 N = 68	$\bar{x}$ = 18.90 s.d. = 6.93 N = 48	1.16	$p > .25$

$\bar{x}$ = mean score
s.d. = standard deviation
N = number of subjects

Then, in order to determine whether the program had a significant effect on test performance, the mean of the eighth graders' posttest scores was compared to the mean of the seventh grade control group. A t-test for independent samples was performed. Since the variances of the two groups were heterogeneous, a conservative test was done which used the degrees of freedom associated with the smaller group (df=47).

Indeed, a significant difference between the experimental (eighth grade) and control (seventh grade) groups was found with the experimental group showing significantly higher test performance than the control group. Since the difference was highly significant (.001 level), these results speak very well for the value of this eighth grade career guidance unit.

It is PSE's recommendation that this eighth grade guidance unit should certainly be used again next year. It will also be important to continue to use the PSE-developed Eighth Grade Career Guidance Test. This test can serve two valuable purposes: (1) for the Project staff, it can be used to verify the data obtained this year in the testing program; and (2) for the teacher of this unit, it can be used as a diagnostic tool at the beginning of the unit to let the teacher know what students do and do not know of the unit's content, and then the test can be used as a final measure of what students have learned during the nine weeks.

The summary of the data analysis results are presented in Table 3. See the Appendix of this report for a copy of the Eighth Grade Career Guidance Test.

Table 3

Means and Standard Deviations
of Experimental (Eighth Grade Posttest Scores)
and Control Groups and t Results

Eighth Grade Experimental	Seventh Grade Control	t Value	Significance Level
$\bar{x}$ = 24.98 s.d. = 9.21 N = 68	$\bar{x}$ = 18.90 s.d. = 6.93 N = 48	3.73	$p < .001$

$\bar{x}$ = mean score
s.d. = standard deviation
N = number of subjects

NINTH GRADE STUDENTS OBJECTIVE

OBJECTIVE

90% of the students will demonstrate knowledge of and ability to apply the following job application skills: (1) correct completion of job application forms; (2) correct writing of job application letters; (3) proper procedure in a job interview; (4) creation of a personal resumé; and (5) identification of sources for finding job opportunities.*

PROGRAM PLAN

Target Population. All ninth grade students

Activity. Participate in career education infused English I classes

Timeline. January - June, 1976

EVALUATION PLAN

Data and Data Source. Students' posttest scores

Sample Size. Approximately 300 program students

Instrument. PSE-developed test

Time(s) of Administration. May

Design. Posttest only without controls

*Formerly objective 7 of PSE's Evaluation Design.

NINTH GRADE STUDENTS OBJECTIVE

The Project staff has made a particular effort to provide career education instruction for ninth grade students in Ceres through their regular English classes. Of course, PSE and many other career education practitioners and leaders find this infusion approach to be quite beneficial to students as well as attractive to teachers because they are able to include career education instruction in the traditional curriculum.

In this case, the knowledge which the Project staff wishes to impart to the students is mainly concerned with job getting skills: the completion of application forms, the writing of application letters, proper procedures for job interviews, drafting a personal resumé, and identifying sources for finding out about job opportunities. To measure this knowledge, PSE developed a 24-item Ninth Grade Career Education English Test matched to sample exercises and pieces of the career education/English curriculum which Ceres made available to us. While the test is mainly four-part multiple choice items, there are several special sections of the test, such as matching pieces of information about a job applicant with the section of a typical resumé in which they would be included, identifying parts of a business letter, and finally writing a job application letter to match one of two want-ads which PSE designed.

Following the Project staff's confirmation of PSE's judgment that we were testing knowledge and skills which students would normally not have a chance to acquire before the ninth grade, PSE decided on a posttest only experimental design. In addition, since all ninth grade students were involved in the program and since there was not a comparable group of students readily available in a nearby district, PSE ruled out the possibility of a control

group experimental design. Given these experimental design characteristics, it was not possible to do a statistical analysis of the students' posttest scores. Therefore, PSE's findings are descriptive only and based on posttest scores of approximately 300 Ceres ninth graders.

Findings

The scoring of the posttest indicated that the Ceres Project fell short by approximately 20-30% of their objective of 90% of these ninth grade students being able to demonstrate their knowledge of and ability to apply these various job getting skills. In order to try to determine the program areas in which these students seemed to learn the most, PSE performed an item analysis. We especially looked at those items on which the greatest number of students were able to respond correctly and those items on which the fewest number of students were able to respond correctly. There did not seem to be any particular pattern to these responses; in other words, the student group as a whole seemed to do both very well and very poorly on items dealing with constructing and using a resumé and both well and poorly on items written about job interviewing procedures. Students did seem to do fairly well on items written about general information in this area and not so well on items written about job application letters.

Listed below are those five items for which more than 75% of the students gave the correct answer. In other words, these are the items on which students are doing the best and, therefore, those for which the career education information is probably being most effectively taught to the students. They are listed in order of most correct responses.

ITEMS	ANSWER
15. During an interview a. only the person applying asks questions. b. only the employer asks questions. c. both the applicant and employer should ask questions. d. the applicant fills out the application form.	C
7. When listing your educational experience on a resumé, you should include which of the following items? a. The name of your school b. Your major subject c. The date you received your degree d. All of the above	D
23. The letter below represents one form of a business letter. Use the names listed below and label the arrowed parts. a. Main Body b. Complimentary Closing c. Name and address of receiver d. Name of sender e. Salutation f. Date	F C E A B D
(A SAMPLE BUSINESS LETTER WAS PRESENTED TO THE STUDENTS WITH THIS QUESTION. SEE THE APPENDIX OF THIS REPORT FOR THE COMPLETE TEST.)	
17. Which of the following persons should not be listed as a reference for a job? a. A former employer b. A supervisor c. One of your parents d. One of your teachers	C
5. A resumé should be a. brief and precise. b. long and involved. c. more than two pages. d. in narrative form.	A

In a similar fashion, listed below are those five items which were correctly answered by less than half of the students tested. These results would indicate that the information needed to answer the questions was not being effectively imparted to the students. These items are again listed in order of most correct responses.

	ITEMS	ANSWER
13.	List three questions you might ask at a job interview.	Subjectively scored
20.	Which of the following sources would supply names of firms you could send resumés to? a. Newspapers b. Trade journals c. Professional directories d. All of the above	D
14.	Where should you put the names of references on a resumé? a. Under Work Experience b. Under Personal Data c. Under Miscellaneous d. Under Education	C
12.	The words listed below refer to the sections of a typical resumé. Rank them in the order in which they would appear on a resumé. (#1 for the first section, etc.) __ Education __ Personal Data __ Heading __ Job Objective __ Work History __ Miscellaneous	4 5 1 2 3 6
24.	Select one of the two want-ad descriptions below and write a job application letter. Be sure to include all the proper and necessary information in the correct form.	Subjectively scored

(TWO SAMPLE WANT-ADS WERE PRESENTED TO THE STUDENTS WITH THIS QUESTION. SEE THE APPENDIX OF THIS REPORT FOR THE COMPLETE TEST.)

In summary, PSE feels that this career education infused English unit is at least making a start in preparing ninth grade students with necessary job getting skills. PSE staff observed two of these classes in progress and found the students and teachers interested in and enthusiastic about the unit. We would suggest that our test might now be given as a pretest so the teachers could use the results diagnostically to determine what information does deserve special instructional emphasis.

For many areas of the country, a practical unit such as this would be premature at the ninth grade level; however, given the nature of the Ceres student body and the likelihood that many of these students will need summer jobs and part-time jobs and will also not go on to college, we feel that this course is at least fairly appropriate to these ninth graders. Next year the Project staff might want to try out this course at the high school level (perhaps with eleventh or twelfth graders) to see if students at that level are more receptive to this practical information and more eager to learn it.

AUTO-ENGLISH STUDENTS OBJECTIVE

OBJECTIVE

The mean score of program students in the Auto-English course will be higher than that of non-program students by a statistically significant amount (.05 level) on a test designed to measure students' knowledge of automotive mechanics, basic vocabulary words, and career education information.*

PROGRAM PLAN

Target Population. All Auto-English students

Activity. Participate in the Auto-English course

Timeline. February - June, 1976

EVALUATION PLAN

Data and Data Source. Students' pretest and posttest scores

Sample Size. Approximately 50 Auto-English students; approximately 30 straight auto students; approximately 50 straight English students

Instrument. PSE-developed test

Time(s) of Administration. April - June

Design. Pretest/posttest with controls

*Formerly objective 10 of PSE's Evaluation Design.

AUTO-ENGLISH STUDENTS OBJECTIVE

In order to determine the effectiveness of the Auto-English course, PSE and the Ceres Project staff developed a rather complex experimental design consisting of three different treatment conditions. The first, designated as the Auto-English condition, taught students principles of automotive mechanics and basic vocabulary and reading skills surrounding these principles in a practical, working situation. In the second condition, called straight auto, students received practical experience but were taught vocabulary and reading skills in a regular English class. The last condition, straight English, was a regular English class.

The Project staff wanted to see if the students in the Auto-English class (a kind of career education/vocational education/English course) were able to learn automotive mechanics knowledge and English skills better than those students in the straight auto class who were scheduled to learn their English grammar and vocabulary skills in regular English classes; in other words, learning English in their automotive mechanics class made English more relevant and practically important to these students and thus the Project staff thought they would do better than those students enrolled in separate auto and English classes. The straight English class served as another control group for the Auto-English students, and this group was used to determine whether these students could perform as well on the PSE-developed test which was strongly tied to good verbal ability of students.

The test mainly consisted of four-part multiple choice questions which were written about both automotive mechanics and career education knowledge. In addition, there were two technical reading sections at the end of the test for which students had to read several paragraphs and answer multiple choice comprehension questions at the end.

Thus, the experimental design PSE used in this testing program was pretest/posttest with two control groups. The students in the three separate treatment groups were pretested and posttested at the same time during the school year after the test items were piloted with Ceres students.

The data analysis for this objective was quite complex. First of all, there were unequal numbers of students in the three treatment conditions, and not all students who received the pretest also took a posttest. The straight auto condition had the fewest number of students with both sets of scores, and it thus set the sample size at 14 students for each treatment condition. All of the students in this straight auto class were boys. From the 29 boys in the Auto-English class who had both sets of scores, 14 were randomly selected for inclusion in the analysis. The straight English condition had the largest number of cases tested at both times (42), but only five of these students were boys. The analysis required an equal number of subjects in each group and also that the groups be similar in pretest standings. Therefore, to decrease any pretest difference or a sex differential among groups, all five boys in the straight English group were chosen plus 9 girls were randomly selected from those girls whose pretest scores fell in the range of one standard deviation unit of the mean of either of the other two groups (Auto-English and straight auto).

However, since the first two groups were each composed strictly of boys, (while boys made up only 36% of the straight English group) and since girls typically do better in tests of language performance, the distinct possibility was present that the groups were very different in language and reading ability. The fact that the students were not randomly assigned to the three treatment conditions also enhanced this possibility.

Therefore, PSE obtained the reading and language scores for the 14 students in each of the three treatment conditions. These two scores were obtained for 86% of the students, 13 in the Auto-English class, 11 in the straight auto class, and 12 in the straight English class.

Findings

The first issue to address was whether the three treatment groups were indeed similar in pretest standing. A randomized-groups analysis of variance was done after testing for homogeneity of variance. As seen in Table 4, there were no significant differences among the means of the three treatment groups on pretest standing. Therefore, the groups could be considered to be starting from similar points on the PSE-developed test.

Table 4

Means and Analysis of Variance for Three Treatment Conditions

Treatment Condition				
Auto-English	Straight Auto	Straight English		
$\bar{x}$ = 35.64	$\bar{x}$ = 40.00	$\bar{x}$ = 35.82		
Analysis of Variance:				
	df[1]	MS[2]	F[3]	Significance Level
Treatment	2	39.45	0.43	>.75
Error	39	90.84		

[1]df = degrees of freedom
[2]MS = mean square
[3]F = the F value used to test for significance

The second issue, however, concerned the similarity of the groups with respect to reading and language ability. Two randomized-groups analyses of

variance were done: one for the set of reading scores and the other for the language measure. The assumption of homogeneity of variance was not rejected in either case.

It was found that while there were no significant differences among the means of the reading scores for the three groups, there was a strongly significant difference in mean language ability among the three groups. Tukey's a posteriori test for mean comparisons was performed and demonstrated that the straight English class had significantly better language scores than either the Auto-English class ($q=4.52$, $p < .01$) or the straight auto class ($q=5.27$, $p < .01$). In contrast, there was no significant difference in language ability between the Auto-English and straight auto groups. Since the straight English group had significantly better language ability and also higher reading scores (though not significantly so), it might be hypothesized on this basis that they would perform better on the posttest measure, while the Auto-English and straight auto groups would be similar in performance. Thus, the program hypothesis that Auto-English is a significantly better teaching method must demonstrate its effect against an opposite differential in ability. The results of these statistical tests on language and reading ability are presented on the following page in Table 5.

Table 5

Means and Analysis of Variance
of Reading and Language Scores for Three Treatment Conditions

	Treatment Condition		
	Auto-English	Straight Auto	Straight English
Reading Scores $\bar{x}$'s	41.15	44.64	53.58

Analysis:	df[1]	MS[2]	F[3]	Significance Level
Treatment	2	505.58	2.38	>.10
Error	33	212.16		

Language Scores $\bar{x}$'s	36.69	33.73	54.50

Analysis:	df[1]	MS[2]	F[3]	Significance Level
Treatment	2	1495.64	8.06	<.001
Error	33	185.45		

[1]df = degrees of freedom
[2]MS = mean square
[3]F = the F value used to test for significance

The test regarding the ability hypothesis versus the program hypothesis was first provided by simply doing a randomized-groups analysis of variance on the posttest measures. The results of this analysis, given in Table 6, show that the variances were not significantly heterogeneous.

Table 6

Means and Analysis of Variance
of Posttest Measures for Three Treatment Groups

	df[1]	MS[2]	F[3]	Significance Level
Treatment	2	1,028.88	5.09	≤ .05
Error	39	202.27		

[1]df = degrees of freedom
[2]MS = mean square
[3]F = the F value used to test for significance

There was a significant difference among the posttest mean of the three treatment conditions. Tukey's a posteriori test for mean comparisons revealed that this difference resulted from the superior performance of the Auto-English group when compared to either the straight auto group ($q=3.36$, $p < .05$) or the straight English group ($q=4.28$, $p \leq .05$). The latter two groups, straight auto and straight English, did not significantly differ from each other ($q=.92$, $p > .50$). Thus, the program hypothesis rather than the ability hypothesis was strongly supported. In fact, the Auto-English program evidenced its superiority despite the inferiority of the students enrolled in it in language and reading ability in comparison to the straight English group.

In conclusion, PSE would recommend that this Auto-English course be continued in Ceres next year. In fact, the data are so favorable as to the value of this program that we would recommend expanding it to include more of the students who would ordinarily take the straight automotive mechanics course. Ceres may also want to try this approach in other vocational education courses/areas.

TEACHING INTERNS OBJECTIVE

OBJECTIVE

Interns will demonstrate an improvement in their attitude toward career education and increase their knowledge and practice of career education.*

PROGRAM PLAN

Target Population. Pre-service interns from Stanislaus State College

Activity. Participate in the CERES Model Project

Timeline. September, 1975 - June, 1976

EVALUATION PLAN

Data and Data Source. Interns' pretest and posttest scores

Sample Size. Approximately 25 Ceres interns and 20 Modesto interns

Instrument. PSE-developed test

Time(s) of Administration. January and May

Design. Pretest/posttest with controls

*Objective 14 in PSE's Evaluation Design.

TEACHING INTERNS OBJECTIVE

Another objective for student learning which was set by the Ceres Project staff concerned not the students in their public school system but rather education students at Stanislaus State College. These students, now ready for their classroom teaching internship experience, were to be assigned to Ceres and other neighboring school districts. The Ceres Project staff felt that those interns assigned to their school system would greatly benefit from the Ceres career education program and thus would become more knowledgeable and positive about career education than those interns sent to districts without formal career education programs. In other words, the Ceres Project staff wanted to improve the interns' attitudes toward career education and increase their knowledge and practice of career education.

In order to have some measure of what interns in non-career education school districts might learn or feel about career education, a control group for the Ceres interns of Stanislaus State College interns assigned to nearby Modesto, California, was selected. We felt that the pretest/posttest with control group experimental design would give the best evidence of the effect of doing a teaching internship in a district with a career education program.

After reviewing a previously used Ceres-developed instrument for these interns, PSE developed a somewhat more challenging and comprehensive instrument for use during the 1975-76 school year. The 29-item questionnaire consisted of 14 attitudinal items (statements about career education to which the interns could strongly agree, agree, disagree, strongly disagree, or register no opinion) and a number of questions about career education information, infusion techniques, and actual practice. At the end of the questionnaire,

the interns were even asked to write a career education infused activity for one of the lessons they were planning to teach during their internship. The instrument was reviewed and approved by the Project staff.

Both the Ceres and Modesto interns were pretested before they began their classroom experience and at the close of their internship (January and May, 1976). The pretests and posttests were returned to PSE for scoring and analysis, and PSE was able to identify 23 matched pretests and posttests among the Ceres interns and 19 matched pretests and posttests among the Modesto interns.

Findings

A t-test for independent samples was performed first to verify that there was no significant difference between the Ceres and Modesto interns on the pretest. The regression coefficients for the two groups were calculated for both the cognitive portion of the instrument and the affective portion of the instrument and, in both cases, they were found to be non-significantly different and sufficiently high that an analysis of ordinary differences scores for the cognitive and affective portions of the instrument was in order. A t-test for independent samples was then performed on the differences scores to address the primary hypothesis that internship in Ceres resulted in a significantly greater change in knowledge and attitudes about career education.

As Table 7 summarizes, the difference between the Ceres interns and the Modesto interns on the cognitive portion of the test (those items which reflected career education knowledge) was highly significant (.001 level), with the Ceres interns having the higher posttest scores. In fact, while 10 Ceres interns improved their pretest to posttest performance by 10 or more points, no Modesto interns were able to register such growth. Furthermore, the Ceres interns' posttest scores showed that these college students really had learned a good amount of career education knowledge (19 of the Ceres interns got half

the test or more correct, while no Modesto interns could answer even half the questions correctly).

On the affective portion of the test (the attitudinal items), however, the difference between the Ceres and Modesto interns was not found to be statistically significant. While 15 of the 23 Ceres interns showed overall positive attitudinal growth, only 9 of the 19 Modesto interns showed positive growth. However, these affective scores for both groups started out fairly high and, thus, it was harder to show pretest to posttest growth. PSE has found that, in some cases, it is difficult to create attitudinal items on which subjects will respond honestly and/or negatively. In other words, it is easy for respondents to check the answer which they feel is desired by those who administer the questionnaire.

Table 7

Means and Standard Deviations for
the Experimental (Ceres Interns) and Control (Modesto Interns) Groups
Posttest Scores and t Results

Cognitive Test

Experimental Group	Control Group	t Value	Significance Level
$\bar{x}$ = 7.96 s.d. = 5.16 N = 23	$\bar{x}$ = 2.10 s.d. = 3.73 N = 19	4.26	$<.001$

Affective Test

Experimental Group	Control Group	t Value	Significance Level
$\bar{x}$ = 5.48 s.d. = 7.95 N = 23	$\bar{x}$ = 3.74 s.d. = 7.78 N = 19	0.71	$>.40$

$\bar{x}$ = mean score
s.d. = standard deviation
N = number of subjects

On the whole, we feel that the positive significant gain in knowledge about career education evidenced by the scores of the Ceres interns is quite important and impressive. This target population (teaching interns) is one that is often neglected and one with which most career education projects have had relatively few dealings. It is to Ceres' credit that they have tried to influence these teaching interns in a pre-service program and that they have done such a successful job. Hopefully, Stanislaus State College and other higher education institutions will be able to see the value of placing their teaching interns in school districts with career education programs.

A copy of the PSE-developed Ceres Career Education Questionnaire for Student Teachers may be found in the Appendix of this report.

OTHER EVALUATION ACTIVITIES: ELEMENTARY STUDENTS OBJECTIVE

On October 23, 1975, PSE delivered to the Ceres Project Director a detailed critique of the Project's original evaluation plan for grades K-6 pupils during 1975-76. As a result of PSE's analysis, it was decided that a new set of elementary tests needed to be developed, pilot tested, revised, and ready for administration in September, 1976. Thus, the elementary students learning objectives contained in PSE's Evaluation Design were carried out by the Ceres Project staff itself and not by PSE.

Instead, based on a more comprehensive and more specific set of career education student learning objectives for elementary students (prepared by Ceres in January, 1976) PSE developed a new version of each of the Project's elementary tests--the Primary Career Objectives Test (PCOT) and the Intermediate Career Objectives Test (ICOT)--to fulfill its evaluation functions.

After careful review and study of these many elementary student learning objectives, PSE staff wrote approximately three or four test items to match most of the objectives. Because so many pilot test items were written for both the PCOT and the ICOT, PSE divided the items into two groups for pilot testing purposes; we felt that elementary school students could not sit through a test of as many items as we needed to pilot test. Thus, PCOT pilot Form A contained 62 items, while PCOT pilot Form B contained 60 items. ICOT pilot Form A contained 77 items, while ICOT pilot Form B contained 68 items.

Both tests are made up of four-part multiple choice items. We did pilot test some basic career education affective (attitudinal) items, but since they were not originally written to match specific Ceres student learning

objectives, we decided not to include them in the final test versions so that these tests would be solely reflective of the intended student learning of the Ceres Project.

PSE did develop a special format for the PCOT because of the Project's concern about the reading and verbal ability of the Ceres third graders. Instead of giving these students a traditional test form, PSE has developed special student answer sheets on which key words from each answer choice are printed in large letters. The teacher then reads the question and the four answer choices, and the student can mark with an "x" the answer he feels is best. This format saves the student from being presented with a typical test form which would be confusing for the average third grader.

It should be noted that both the PCOT and ICOT are tests of cumulative career education learning. Although the PCOT is administered to third graders, it tests career education knowledge which students have learned in the Ceres career education program from kindergarten through the third grade. In a similar way, although the ICOT is administered to sixth graders, it tests career education knowledge that these students would have learned in the fourth through the sixth grades.

PSE and the Ceres Project staff carried out an extensive pilot testing program. The PCOT Forms A and B were each pilot tested with approximately two classes of third grade Ceres students, two classes of third grade students from a nearby district without a career education program, and two classes of second grade Ceres students. Similarly, the ICOT Forms A and B were pilot tested with approximately two classes of sixth grade Ceres students, two classes of sixth graders from a nearby district without a formal career education program, and two classes of fifth grade Ceres students. The control groups (the students from the nearby district without a formal career education

program) were used so that PSE could choose items which discriminated between the Ceres students and the other students (those items which the Ceres students were able to answer correctly, thus showing learning as a result of the Ceres career education program, and which the other students were not able to answer correctly, thus showing a lack of career education information). The second and fifth grade classrooms were used as a check for maturity and cumulative learning. The final single form of both the PCOT and ICOT contains two items for each Ceres student learning objective.

PSE would recommend that Ceres third graders be pretested in September, 1976, and posttested in June, 1977, with this final PCOT version. Similarly, Ceres sixth grade students should be pretested and posttested with the final ICOT version. In addition, two control groups from a nearby school district without a formal career education program should also be tested; these control groups' scores could then be used as the third and sixth grade norms, a kind of permanent yardstick against which the Ceres students' scores could be measured. These norms would probably be good for at least several years and would thus save the Ceres Project from expensive control group testing every year.

The final PCOT and ICOT versions may be found in the Appendix of this report.

CONCLUSIONS AND RECOMMENDATIONS

Because of PSE's close working relationship with the Project for primarily summative evaluation purposes, we have been able to collect much information and make observations which would allow us to comment on the performance of the Project in general. Our comments below are based on a combination of our impressions and observations of the Project during frequent site visits and conversations as well as on the empirical evidence which we gathered about student learning. We hope that the Project staff and other concerned parties find our conclusions accurate and our recommendations useful. Some of these have been reported to the Project staff earlier in our Interim Progress Report, but we feel they are still appropriate and important.

1. The Ceres Project Director and staff are extremely hardworking, dedicated, and productive. Their enthusiasm and support for career education is extraordinary. More unusual, but also important, is Ceres' attitude toward evaluation. In no other district do we find such an eager interest to find ways and techniques of measuring performance.

2. Lines among communication among staff members are open, and they they appear to function well as a team.

3. There is a favorable support climate for career education among central office administrators, particularly the Superintendent. This support is also evidenced among building principals, particularly the senior high school principal, to a lesser extent among elementary school principals, and least at the junior high level.

4. The Project staff appears to get much support from teachers and administrators actively involved in the program. They see the Project staff as capable and responsive to their needs.

5. There is a strong career education climate in Ceres, both in and out of school. Perhaps, due to the large number of vocationally oriented students, career information and experiences are necessarily valuable. Whatever the reason, the Ceres environment blends extremely well with the major objectives and intent of career education. It is an acceptable idea and one which appears extremely important to most instructional staff and community residents. The Project staff has done an extremely good job in using this support to further their ends.

6. Career education in Ceres seems to be strongest at the elementary level and at the skill-preparation level of the secondary schools. That is, the elementary teachers seem to have made the best use of the ideas and activities available for career education instruction, and more career education seems to be carried out in those classrooms than in secondary classrooms. The use of the PSE-developed Primary Career Objectives Test and Intermediate Career Objectives Test in a well designed testing program next year will be an important step in documenting and demonstrating the seemingly high degree of career education implementation in the elementary schools.

   The wide array of occupational training courses available at the secondary level has apparently taken on a wider and more comprehensive objective than pure skill development. Promoting good attitudes toward work and expanding the information base the students have about various career options appears to be an important component of most skill preparation courses in Ceres. Both the teachers of and students in these courses praise and value their career education component. On the other hand, we have found less evidence of career education infusion in the academic areas at the junior high and senior high levels. Project staff, we believe, recognize this and are attempting to find ways to influence the teaching staff. We believe that materials and products exhibiting career education infusion in the secondary level curriculum would be a crucial part of secondary level staff development. Although the seventh and eighth grade career guidance and awareness mini-courses are "add-ons" to the secondary level curriculum, the ninth grade English course which has been infused with practical job getting skills is a step in the right direction toward infusion. Perhaps now career education infusion might be attempted in other secondary level English courses as the next step in infusing career education in the entire secondary curriculum.

7. While PSE did not have as much contact with the special education component of this program as we would have liked, we did visit special education classes in Ceres and found the career education-related instruction most impressive. We felt, however, that the special education staff might need more leadership in providing comprehensive career education instruction for their students.

8. Ceres should be commended for the design of a program which really does incorporate all aspects of student instruction--from kindergarten through pre-service preparation. This, we believe, is in line with the ambitious nature of the staff. At the same time, we feel that there could be somewhat better articulation among the various components of the program. Now that many of the component areas are beginning to produce increased, measurable student learning and now that at least some career education curriculum materials and instructional goals and objectives have been created and proved effective along with some teaching strategies and approaches, more time and consideration can be given to coordinating the efforts of the different components' staffs and involved parties.

9. Ceres has certainly made a good start at producing measurable student career education learning as evidenced by the following results of PSE's extensive testing program in Ceres' schools:

   - after participation in the Ceres-developed Seventh Grade Guidance and Career Awareness unit, the distribution of posttest scores did have a significantly higher median than the distribution of pretest scores, thus showing significantly improved student learning of career education information such as the identification of students' personal interests and abilities, the relationship of these to the choice of a future job, and ways to obtain basic information on careers;

   - after participation in the eighth grade version of this course, Career Guidance, Exploration, and Planning, a highly significant difference between the Ceres' eighth graders and a control group was found with the Ceres' eighth graders showing significantly more career education knowledge about their interests and their abilities, the relationship of these to the world of work, and the understanding of and use of the decision-making process;

   - after participation in a ninth grade English class infused with knowledge about job getting skills, students showed some understanding of this practical career education area although not as much as the Project staff had hoped;

   - after participation in the Ceres-created Auto-English class (a kind of career education/vocational education/English course), these students were able to show superior performance (on a test designed to measure both automotive mechanics knowledge and English grammar and vocabulary) over two control groups, a regular automotive mechanics class and a regular English class (in fact, the Auto-English program evidenced its superiority despite the inferiority of the students enrolled in it in language and reading ability in comparison with the regular English class students);

10. The CERES Model Project not only has increased the career awareness of its K-12 students but also has favorably influenced Ceres-based pre-service teaching interns. After participation in pre-service teacher training in the Ceres Unified School District, Ceres interns showed greater knowledge of career education than teaching interns in a nearby school district without a career education program and also showed greater improvement from the pre-internship testing to the post-internship testing of career education knowledge than the control group interns (the difference between the Ceres and control group interns on the affective portion of the test, the attitudinal items, was not found to be statistically significant, however).

11. There is a great deal of career education instruction and activity taking place in CERES and this is due primarily to the basic interest in the goals and objectives of career education, as well as to the leadership by the Project staff. At the same time, we feel that

for long-term effect there is a definite need for a stronger conceptual structure for the program. Such a structure would lay out the content of the program, its relationship to subject fields, and its sequencing over grades K-12, and perhaps beyond. Lacking this conceptual structure, it is difficult for the staff to describe and interpret the full content of career education when dealing with the faculty and community, to explain to the faculty why certain clusters need to be assigned to certain subject fields, and to help teachers conduct classroom activities in a planned sequence rather than conducting them at random as is presently the case. We believe that a conceptual structure for career education that sets out objectives in a clear pattern is the best source of guidance to the staff and to the teachers as to the proper sequencing of career learning.

12. Along with this conceptual structure, we feel there need to be materials and products identified to deliver on the stated objectives. Though, at this point, many teachers in Ceres are well equipped to design and carry out instructional activities for career education on their own, there are still a number who could profit from tangible products and specific ideas to teach certain desired learning.

In summary, we feel that the Ceres Project is an extremely strong and ambitious effort in career education. Almost all of our evaluation activities have yielded highly positive results favorable to the Project. It is certainly one of the most comprehensive programs we have had the pleasure of evaluating. It is perhaps due to this comprehensiveness that the Project staff has not always been able to devote time to the development of an articulated, well conceptualized model of career education for Ceres' K-12 students, higher education students, special populations, and systematic teaching staff development. Since most of the pieces for this model exist in Ceres--and are probably implemented on a weekly, if not daily, basis--the staff can now turn its attention to this final conceptualizing. PSE has no doubt that the Project staff is both willing to undertake this task and capable of carrying it out in a thorough and enthusiastic fashion.